



# FAA National Software Conference

## FAA Software Activities



**FAA's Aircraft Certification  
Software Activities**



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**Software Grand Design (SGD)**

**FAA's Aircraft  
Certification  
Software Vision**



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## FAA Software Activities

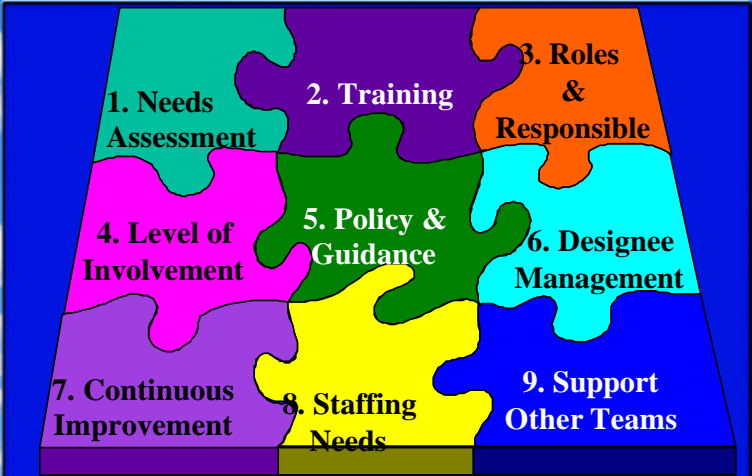
Software Grand Design (SGD)

- Started July 1996
- Charter Objectives
  1. Software integration into AIR processes
  2. Functional roles & responsibilities
  3. Knowledge/Skills/Abilities
  4. Training
  5. Short-comings
- August 1997 - SGD Report
- December 1997 - SGD Implementation Plan
- February 2000 - Completed SGD Reports

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SGD Implementation



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## FAA Software Activities




### Overview of Aircraft Certification's Software Program (for Year 2000)

- Software Steering Team (SST)
- Streamlining Software Aspects of Certification (SSAC)
- Technical ReUsable Software Team (TRUST)
- Certification Authorities Software Team (CAST)
- Software Policy Development
- Software Training
- RTCA Software-Related Activities
- Software Web-Site
- Software and Digital Systems Safety Research Program
- Complex Electronic Hardware
- AIA/GAMA Software Activities

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Note: Plan will be updated annually.




### Software Steering Team (SST)

- Purpose: To Implement Continuous Improvement of SGD
- Examples of areas for improvement:
  - Policy
  - Training
  - Staffing
- Began October 1999
- Approximately Same Members as SGD Team
- Meet 2X per Year

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### Streamlining Software Aspects of Cert (SSAC) (1/3)

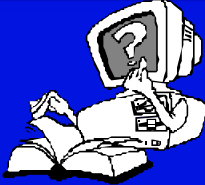
- Program began in April, 1997
- Joint effort between airborne and ground-based communities
- Objectives:
  - To analyze the current SW approval process
  - To assess if the expense/time burden yields the safety benefits
  - To establish streamlined processes for SW aspects of certification (faster, cheaper, safer)
  - Safety is a priority

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### Streamlining Software Aspects of Cert (SSAC) (2/3)


- Activities To Date:
  - Three Industry Workshops
  - Industry Survey
  - Survey Report with Recommendations To FAA
  - FAA Response to Recommendations
  - FAA Workshop
  - Web-site:
    - <http://shemesh.larc.nasa.gov/ssac/>



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## FAA Software Activities



### Streamlining Software Aspects of Cert (SSAC) (3/3)

- **Current Status**
  - “On hold” due to budget constraints
  - Continuing to Use Input from SSAC for Process Improvement:
    - Software Reuse Activities
    - Research Activities
    - On-going Coordination with Industry

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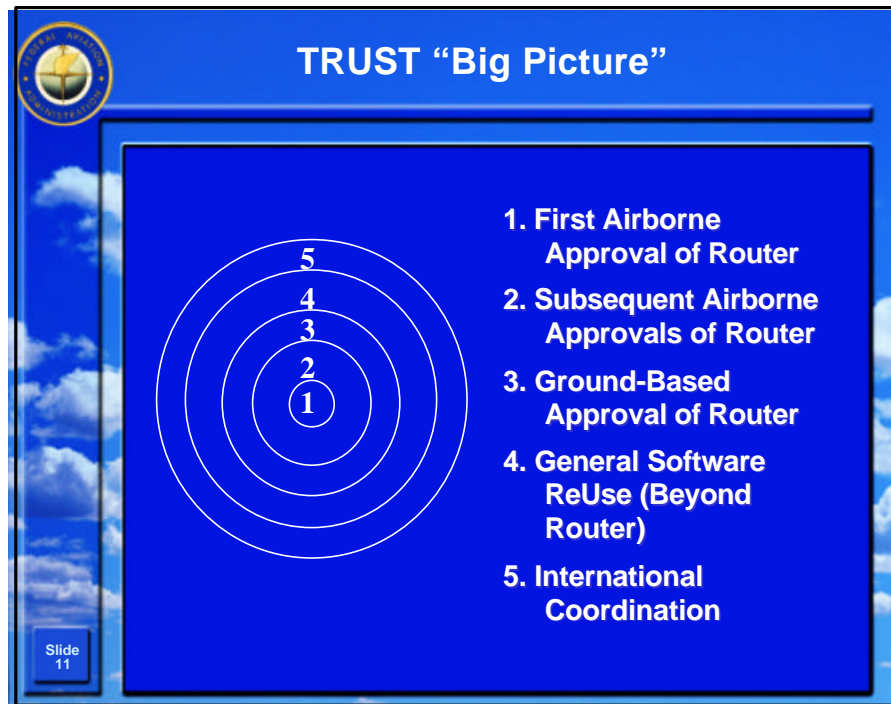
### Technical ReUsable Software Team (TRUST)

- Started: January, 1999
- Joint Sponsors: FAA Airborne and Ground-based Communities
- Purpose: To Address Software Reuse in Certification Projects

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## FAA Software Activities



**Certification Authorities  
Software Team (CAST) (2/2)**

- Example of Papers in Work:
  - Software Partitioning/Protection
  - Software ReUse in Certification Projects
  - Neural Nets in Aviation
  - Object-Oriented Technology in Certification Projects
  - Software Problem Reporting
  - Airborne Databases

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**FAA Software Policy Development**

- Change Impact Analysis Guidelines
- Criteria to Determine Level of FAA Involvement in Software projects
- FAA's Software Roles and Responsibilities
- Software Reuse Guidelines
- Software Conformity Guidelines
- Source to Object Code Traceability Guidelines
- Mega Software Policy Document

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## FAA Software Activities



### Software Training

- Software Fundamentals Course (On-going)
- Prototype Software Procedures Course (June 00)
- National Software Standardization Conference #1 (April 00)
- National Software Standardization Conference #2 (August 00)
- Modified Condition/Decision Coverage Tutorial (Late-2000)

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### Software Training (cont)


- Change impact analysis interactive video teletraining (IVT) (May 00)
- Conformity IVT (Sept 00)
- Software Procedures Course for FAA engineers and DERs (Late-2000)
- Materials on the Web (on-going)
- Videos
  - Software Job-aid Video (currently available)
  - Software Policy Video (currently available)
  - Change impact analysis & conformity videos (available after IVTs)

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## FAA Software Activities



### RTCA Software-Related Committees

- RTCA SC-190: DO-178B Clarification
  - Errata
  - Frequently Asked Questions
  - Discussion Papers
  - Annual Report
- RTCA SC-182: Avionics Computer Resource (completed)
- RTCA SC-180: Complex Electronic Hardware (completed)



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### FAA Software Web-Site

Software Home Page:


<http://av-info.faa.gov/software>



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## FAA Software Activities

 **Flight Critical Digital Systems Research Program**

- Striving to Research Issues to Support FAA Policy, Guidance, and Training Efforts

**Three Research Tracks** → **Software**  
**Complex Hardware**  
**Digital Systems**

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 **Software Research Tasks**


- \*Commercial-Off-The-Shelf (COTS) Software
- \*Software Service History
- \*Object-Oriented Technology
- \*Software Reuse
- \*Software Development Tools
- Software Testing/Verification
- Avionics Computer Resource (Partitioning/Protection)
- Software Quality Safety Metrics
- Neural Nets

Note: \* = PRIORITY PROJECTS

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## FAA Software Activities



### Complex Hardware Research Tasks

- Case study to identify problematic areas of DO-TBD and to develop training
  - Started in 1999 with NASA Langley
  - On-going

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### System Research Tasks

- Fly-by-wire systems
- In-flight advisor
- Mode confusion study

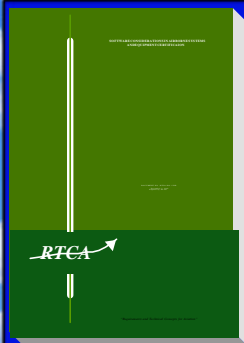
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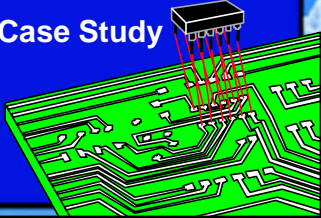
## FAA Software Activities



### Complex Electronic Hardware



- IVT/Video Training
- Release of DO-TBD
- Advisory Circular
- Designee Qualifications
- Research Program
- Training/Case Study



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### GAMA/AIA Software Activities

- Developing Standard for Software Used In Manufacturing
- Standard will be basis for FAA Policy/Guidance
- Kick-off -- August 1999
- Aiming for completion in 2002

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### Summary

- FAA's Aircraft Certification Service has a software vision
- FAA is working with industry to implement the vision
- Software training, policy, and research are integral pieces of the vision
- The "vision" will be modified annually to meet new technology challenges

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